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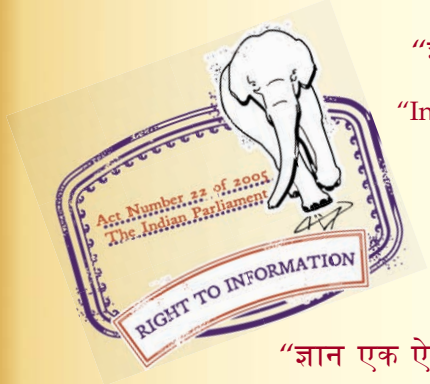

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Indian Standard

METHODS OF TEST FOR COATED AND TREATED FABRICS

PART II DETERMINATION OF BREAKING STRENGTH AND EXTENSION AT BREAK

(First Revision)

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METHODS OF TEST FOR COATED AND TREATED FABRICS

PART II DETERMINATION OF BREAKING STRENGTH AND EXTENSION AT BREAK

(First Revision)

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(*Continued on page* 7)

Indian Standard

METHODS OF TEST FOR COATED AND TREATED FABRICS

PART II DETERMINATION OF BREAKING STRENGTH AND EXTENSION AT BREAK

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part II) (First Revision) was adopted by the Indian Standards Institution on 13 March 1981, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 This standard was first published in 1973 and is now being revised to align it with ISO 1421-1977 'Fabrics coated with rubber or plastics — Determination of breaking strength and elongation at break' issued by International Organization for Standardization.

0.3 The strength value determined when a specimen of textile fabric or coated fabric is tested to breaking is not a fixed quantity; it depends on the width and length of the specimen, on its moisture content, temperature and on the speed at which the breaking load is reached. In addition to real changes in specimen strength, errors in observed value can occur through errors of the testing machine and its operation. The testing machine is accurate under static or slow moving conditions, but not so in the case of very rapidly applied load. Failure to grip the whole width of specimens leads to partial slip and to less than the fair estimate of strength. At present, therefore, the concept of breaking strength of a coated and treated fabric is an empirical approximation under one-way stretch conditions to the biaxial strength shown by the fabric in actual service. For the sake of general agreement on quality assessment it has become necessary to standardize most of the conditions under which breaking strength of base fabrics should be tested, and as far as possible similar conditions are desirable for coated fabrics.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated,

expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part II) covers methods of test for determination of breaking strength and extension at break using the following types of machines:

a) Constant rate of load,

b) Constant rate of traverse, and

c) Constant rate of specimen extension.

1.1.1 This method is not suitable for use with products of which base cloth is of mesh construction or with knit fabrics.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 2244-1972† shall apply.

3. APPARATUS

3.1 Tensile Testing Machine — All tensile machines shall be provided with means for indicating or preferably for recording both the maximum load applied to the specimen in stretching it to rupture and the corresponding extension of the specimen. Alternatively any other means to measure extension may be used. Under the conditions of use, the error of the indicated or recorded maximum load at any point in the range in which the machine is used shall not exceed $\pm$ 1 percent of the load, and the error of the indicated or recorded maximum jaw separation shall not exceed 1 mm. The central points of the two jaws of the machine shall be in the line of pull, the front edges shall be perpendicular to the line of pull, and their clamping faces shall be in the same plane. The jaws shall be capable of holding the specimen without allowing it to slip, shall be so designed that they do not cut or otherwise weaken the specimen, and shall be wider than the test specimen. The faces of the jaws should preferably be smooth and flat, but when the specimens cannot be satisfactorily held with flat-faced jaws even with packing, engraved or corrugated jaws may be used.

*Rules for rounding off numerical values (*revised*).

†Glossary of terms relating to treated fabrics (*first revision*).

NOTE — Pieces of felt approximately 3 mm thick have been found to be suitable for packing, but the choice of type of jaws and packing should be that combination which gives the highest breaking load and does not cause an undue number of breaks in close proximity to the edges of the jaws. Suitable packing materials for use with either smooth or corrugated jaws include paper, felt, leather, plastics or rubber sheets.

3.1.1 *Constant-Rate-of-Load Machines* — After the first 10 seconds of the test, the average rate of increase of load in any two seconds interval shall not differ by more than 25 percent from the average rate of increase of load over the whole period of the test.

The machine shall apply the required load within 60 ± 10 seconds. The required load shall be the specified minimum breaking load or, when the minimum breaking load is not specified, the average breaking load as estimated from preliminary experiments.

3.1.2 *Constant-Rate-of-Traverse Machines* — After the first five seconds of the test, the average rate of traverse of the pulling jaw in any two seconds interval shall not differ by more than 5 percent from the average rate of traverse over the whole period of the test. The rate of traverse of the pulling jaw shall be 100 ± 10 mm/min.

3.1.3 *Constant-Rate-of-Extension Machines* — For machines in which the rate of separation of the clamps is independent of the extensibility of the material under test, the rate of traverse of the pulling jaw shall be such that rupture is reached in 60 ± 10 seconds.

4. TIME LAPSE BETWEEN MANUFACTURE AND TESTING

4.1 For all test purposes the minimum time between manufacture and testing shall be 16 hours, in order to ensure that the material attains dimensional stability due to stress relaxation.

4.2 In order to bind the user and supplier to a stipulated time for carrying out conformity test for supplied material, the following shall apply.

4.2.1 For non product test separate test piece is required for testing. Therefore, the maximum time between the manufacture and testing shall be eight weeks and for evaluation intended to be comparable, the tests as far as possible, should be carried out after the same time interval.

4.2.2 For product test whenever possible the time between manufacture and testing should not exceed six months. In other cases tests shall be made within four months of the date of the receipt of the product by the customer.

5. TEST PIECES

5.1 From the sample, cut test pieces of coated and treated fabric 50 ± 0·5 mm wide and of convenient length so as to permit a free length of

200 mm between the jaws. Five test pieces shall be cut with the length parallel to the warp threads and five test pieces with the length parallel to the weft thread. In case of difficulty, establish the direction of the warp thread by tearing and then cut test pieces parallel to this direction. Select test pieces fairly evenly spaced over the full usable length and width of the sample avoiding the selvedge so that no two test pieces contain the same warp threads or weft threads as the case may be.

6. CONDITIONING

6.1 Conditioning — Condition the test pieces at 27 ± 2°C and 65 ± 5 percent relative humidity for 48 hours prior to testing.

7. PROCEDURE

7.1 Set the jaws of the testing machine 200 ± 1 mm apart. Clamp a test piece centrally in the jaws so that its longitudinal centre line passes through the centre points of the front edges of the grips. Apply the appropriate pre-tension from the following values:

	Recommended Pre-tension
a) For fabrics up to and including 200 g/m²	2 N
b) For fabrics over 200 and up to and including 500 g/m²	5 N
c) For fabrics over 500 g/m²	10 N

7.2 Engage any device for reading the breaking load and elongation, put the moving clamp in motion and extend the test piece to the point of rupture under the conditions appropriate for the type of machine being used as specified in 3. Repeat the procedure for each test piece.

NOTE — If any test piece breaks within 10 mm of line of contact of either of the jaws, record the result; but if it is found to have broken at a load less than 75 percent of the average of the remainder of the specimens do not use it in calculating the breaking load. Test another specimen.

8. EXPRESSION OF RESULTS

8.1 Breaking Load — Calculate the mean of the five results for breaking load for each direction and report the values obtained as breaking load in N/50 mm width stating method used.

8.2 Extension at Break — Calculate the mean of the five results in each direction and express this as a percentage of the initial gauge length as follows:

$$\text{Extension at break, percent} = \frac{\text{Increase in gauge length}}{\text{Original gauge length}} \times 100$$

(*Continued from page 2*)

Panel for Physical Methods of Test for Treated Fabrics, PCDC 16:6:1

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